and Lucretius to Newton seemed to be realized; every event made intelligible, in terms of the motions and interactions of solid masses ranging from the invisible atom to the largest and remotest star.

Almost to the end of the nineteenth century nearly all of a succession of great discoveries in the physical and biological sciences seemed to conspire to render this mechanical theory of the universe more and more plausible. The two fundamental sciences of physics and chemistry independently found the reality of the atom to be an indispensable hypothesis ; and thus confirmed the ancient atomic theory. The corpuscular theory of light and the vibratory theory of heat fell nicely into the scheme.

Before the middle of the nineteenth century came the formulation and verification in many instances of the law of conservation of energy, a law readily conceived as identical with, or a corollary of, the law of conservation of momentum. And this law was very generally held to rule out the possibility of any form of vitalism, or, in other words, to prove that the processes which make up the life-history of every organism can be no exception to the general rule—must, in short, like every process of the inanimate realm, be conceived as analysable, in principle, into the motions and impacts of a multitude of atoms strictly conforming to the laws of mechanical causation.

In the foregoing sentence the word * vitalism ' is used and briefly denned. The word is so important for our discussion that a short excursus on the history of its usage

must here be made.

Vitalism

In the late middle ages, when scientific inquiry began to stir from its long sleep, physiological speculation was